What determine firms' Capital Structure in China?

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Abstract

Purpose – This paper investigates the determinants of capital structure using a cross-section sample of 1481 non-financial firms listed on the Chinese stock exchanges in 2011.

Design/methodology/approach – Employing four leverage measures (total leverage and long-term leverage in terms of both book value and market value, respectively), this study examines the effects of factors with proven influences on capital structure in literature, along with industry effect and ownership effect.

Findings – We find that large firms favour debt financing while profitable firms rely more on internal capital accumulation. Intangibility and business risk increase the level of debt financing but tax has little impact on capital structure. We also observe strong industrial effect and ownership effect. Real estate firms borrow considerably more and firms from utility and manufacturing industries use more long-term debt despite compared with commercial firms. On the other hand, firms with state ownership tend to borrow more, while firms with foreign ownership choose more equity financing.

Research limitations – The study uses cross-section data to avoid any potential time effects, which allows us to focus on our main research question – to identify the determinants of capital structure for Chinese firms. Future research may gain more insights using panel data and considering other factors such as crisis and financial reforms.

Practical implications – These results may provide important implications to investors in making investment decision and to firms in making financing decisions.

Originality/value – this paper uses by far the largest and latest cross-section sample from the Chinese stock markets, offering a more complete picture of the financing behaviours in the Chinese firms, with known characters and the impact of ownerships.

Key Words: Capital Structure; Leverage; Corporate financing; Ownership; China

Paper type: Research paper

JEL: C12, G32, P34

I. Introduction

Since Modigliani and Miller (1958) first proposed the classic MM-Irrelevant theory asserting that firm value is independent of its capital structure in a perfect financial market, capital structure has become an important research subject. Over the past half century, different theories have been developed explaining the firms' financing decision, including the trade-off theory (Miller, 1977), the pecking order hypothesis (Myers and Majluf's, 1984), the agency cost theory (Jensen and Meckling, 1976), and the equity market timing theory (Baker and Wurgler, 2002). Meanwhile, studies suggest that capital structure is also affected by a set of firm level characteristics, such as profitability, size of firm, collateral value of assets, non-debt tax shields, growth opportunity, uniqueness, industry, and volatility (Titman and Wessels, 1988); the macroeconomic environment (Korajczyk and Levy, 2003); and ownership structure (Bajaj *et al*., 1998).

Both theoretical and empirical research has focused on developed countries with limited attention to developing countries. Although the decisive factors of capital structure in developed countries are relevant in developing countries (Booth *et al*., 2001), the distinct institutional features may lead to significant differences (Wald, 1999; Chen, 2004). For example, non-financial firms in US rely on internal capital financing by more than 62% (Myers and Majluf, 1984), in contrast to firms in China that raise more than 50% of capitals from equity issuance or external debt (Chen, 2004). Indeed, there is a gap in literature on whether the classic theories derived from developed countries also work in developing countries. This paper attempts to fill in the gap and enrich our understanding by investigating the determinants of capital structure of non-financial firms from the perspective of developing countries, in particular, China.

We consider China as a natural laboratory that provides us a unique institutional and economic environment for investigating the determinants of capital structure. First, China is the second largest economies in the world and the largest emerging economy with increasingly influential role in the world's economic system.

However, this economic miracle has been achieved without a modern financial system in place. For instance, the bond market in China is still in its infancy and the majority of bond issuance is treasury bonds with only 3% of corporate bonds issuance (Zhang, 2008). Second, Chinese economy is in a transitional process from a centrally-planned economic system to a market-oriented one and its security markets emerged only in the 1990s. The development of the capital markets and the growth of non-state financial institutions have been hindered by the monopoly of state (Chen, 2004) and both the financial markets and economic institutions are in an urgent need for further development. Third, a large number of large listed firms are state-owned enterprises (SOEs) that enjoy the monopoly power while not necessarily pursue profits. SOEs are subject to a soft credit constraint without effective financial supervision mechanisms and bankruptcy constraints as in developed countries. Finally, listed firms in China use significantly more short-term debt than long-term debt. Some firms even have no long-term debt. Short-term debt may lower financing costs in the short run, but may increase the financial and operational risks, which in turn undermines the sustainability of firms' development in the long run.

This paper investigates the determinants of the capital structure using a cross-section sample of 1481 non-financial firms listed on the Chinese stock exchanges in 2011. Employing four leverage measures (total leverage and long-term leverage in terms of both book value and market value, respectively), this study examines the effects of factors with proven influences on capital structure in literature, along with industry effect and ownership effect. We find that large firms favour debt financing while profitable firms rely more on internal capital accumulation. Intangibility and business risk increase the level of debt financing but tax has little impact on capital structure. We also observe a strong industry effect that real estate firms borrow considerably more and firms from utility and manufacturing industries use more long-term debt compared with commercials firms. Furthermore, ownership structure is found to have a significant impact on financing decision. Firms with state ownership tend to borrow more, in contrast to firms with foreign ownership that choose more equity financing. These results may provide important implications to

investors in making investment decision and to firms in making financing decisions.

The rest of this paper proceeds as follows. Section 2 reviews literature. Section 3 describes data and empirical models. Section 4 analyzes results and section 5 concludes.

2. Literature Review

The earliest capital structure theory can be traced back to 1952 when Durand argued that capital structure is a relevant factor for firm valuation. Modigliani and Miller (1958, 1963) assert that the capital structure is irrelevant in determining the market value of a firm in a perfect market without taxes and transaction and bankruptcy costs and higher leverage increases the required return on equity because of higher risks. But with taxes, leverage can lower a firm's tax payment because interest payments are deductable before tax and thus optimal capital structure exist as the leverage level increases the weighted average cost of capital (WACC) decreases.

The trade-off theory argues that a firm is faced with increased financial risk when obtaining tax saving from debt financing (Kraus and Litzenberger; 1973) and the optimal capital structure can be achieved when the marginal present value of the tax shield is equal to the marginal present value of the costs of financial distress arising from additional debt (Warner, 1977). This view is supported by empirical studies, such as Fama (1970), Warner (1977), Miller (1977), Diamond (1989), and Stulz (1990), Fama and French (2002), Morellec, Nikolov and Schurhoff (2012), among others. The implication is that profitable and growing firms with lower costs of financial distress should use more debt and equity financing may be a better choice for unprofitable and risky companies. However, this theory cannot explain why most profitable firms borrow the least and nor to answer why firms with same taxation have different capital structure (Chen and Strange, 2005). On the other hand, a study by An (2012) finds the Chinese firms respond to a change of taxation regime by raising their capital structures.

The pecking order theory (Myers and Majluf, 1984) proposes that firms usually prefer internal finance to external finance and prefer debt to equity when internal

finance is insufficient. This is to avoid adverse effect of asymmetric information that investors tend to believe that firms issue equity when stock prices are overpriced and therefore stock prices would fall after stock issue is announced. Shyam-Sunder and Myers (1999) support this view, while Frank and Goyal (2003) indicate that the theory better describes the behavior of large firms but not small firms. However, other studies suggest that firms with access to investment-grade debt may be reluctant to issue security (Chirinko and Singha, 2000; Chikolwa, 2009) and profitable firms actually have a lower debt ratio (Brennan ad Kraus, 1987; Narayanan, 1988; Noe, 1988; Heinkel and Zechner, 1990; Rajan and Zingales, 1995; Fama and French, 2002).

The agency cost theory (Jensen and Meckling, 1976; Jensen, 1986) claims that the optimal utilisation of debt could increase the value of shareholders but overwhelming debt financing may cause damage. Firms incur agency costs (i.e. monitoring and bonding costs) to ensure agents (managers) acting in the best interests of principals (shareholders). When there is a separation between ownership and management, the conflict of goals between managers and owners and between different stakeholders emerges. For instance, equity holders with residual claims and limited liability concern more about profits from venture investment, while the debt-holders concern more the security of their claims. Harris and Raviv (1991) test for the agency costs hypothesis and show a bidirectional impact of capital structure and agency problems. Berger and Bonaccorsi di Patti (2005) suggest that managers of highly leveraged firms may shift risk or reduce effort to control risk, resulting in expected costs of financial stress, bankruptcy, or liquidation. Morellec, Nikolov and Schurhoff (2012) examine the conflicts between shareholders and agents in capital structure decisions and confirm the conflicts in choosing an optional capital structure and how governance mechanism mitigating the issue.

Taking the market fluctuation into consideration, the equity market timing hypothesis is proposed by Myers and Majluf (1984) and subsequent studies document that firms tend to raise equity funds when the market values are high and repurchase equity when the market values are low (Taggart, 1977; Baker and Wurgler, 2002;

Chen, 2004; Alti, 2006). Baker and Wurgler (2002) claim that the persistent effect of the fluctuations in market valuation on capital structure last for more than a decade, while a more recent study by Kayhan and Titman (2007) shows that the effect of market timing on financing activity is only in the short run. The equity market timing theory successfully predicts the effect of market-to-book ratio, but equity market timing should not be the only factor on the prediction of data patterns (Frank and Goyal, 2009).

Inspired by the variety of theories, a voluminous research investigates the determinants of capital structure. Titman and Wessels (1988) examine a set of control variables determining capital structure and find that the leverage is positively related to firm size, fixed assets, non-debt tax shields, investment opportunities, but negatively associated with volatility, advertising expenditure, the probability of bankruptcy, profitability, and the uniqueness of the products. These findings are supported by subsequent studies (Harris and Raviv, 1991; Rajan and Zingales, 1995; Frank and Goyal, 2003; Morellec *et al*., 2012), except for Wald (1999) that reports a negative relationship between leverage and non-debt tax shields. Ownership structure is also found to affect capital structure and a positive correlation between ownership and debt-equity ratio is documented by Leland and Pyle (1977) and Bajaj *et al.* (1998).

Given the under-developed capital markets, research on capital structure in developing countries is scarce. Existing studies (Booth et al, 2001; Wiwattanakantang, 1999) indicate that literature on capital structure in developed countries is relevant to developing countries, while the differences in the institutional and economic environment also matter (Wald, 1999; Huang and Song, 2006; Chen, 2004). Based on data on 221 industrial listed firms on Shanghai Stock Exchanges (SHSE) during 1995-1997, Hong and Shen (2000) find that profitability and size are significant factors in determining the debt ratio. A later study by Chen (2004) suggests that firms' debt level is positively affected by growth opportunity and tangibility, but negatively affected by profitability and firms' size. It proposes a new pecking order for Chinese firms: retained profit, equity, and long-term debt. Li, Yue and Zhao (2009), using a

dataset of private firms, report a positive relation between state owned shares and leverage, and negative one between foreign ownership and leverage.

In an imperfect capital market with corporate tax, transaction and bankruptcy costs, and asymmetric information, different firms face different financing instruments related to diverse levels of financial distress costs as evidenced by the latest study by Oztekin and Flannery (2012). Given the uniqueness of Chinese institutional infrastructure and economic environment, it is important to examine the determinants of the capital structure of Chinese firms and contribute to literature from the perspective of developing countries. Findings from China will also be of particular relevance to other developing countries and emerging economies.

3. Data, variables and empirical models

3.1 The definition of variables

The dependent variable – capital structure – can be defined differently. MM theory suggests defining the capital structure in terms of the market value of debt and equity. However, financial market fluctuations make market value measures difficult and unreliable (Myers, 1977) and managers are also reluctant to continuously rebalance the capital structure in response to equity market movements due to the costs of policy adjustment (Graham and Harvey, 2001). On the other hand, accounting book value measures are backward looking, which may prevent firms from making accurate financing decision (Welch, 2004). Some empirical studies employ market value measures (Baker and Wurgler, 2002; Barclay et al., 2006), while others use both market value and accounting book value measures (Bennett and Donnelly, 1993; Booth, 2001; Alti, 2006). Moreover, early studies tend to employ a single leverage ratio (either long-term or total leverage ratio) (Bennett and Donnelly, 1993; Bradley *et al*., 1984; DeWenter and Malatesta, 2001). Indeed, a firm's financing capability is affected by the compositions of debts (Huang and Song, 2006) and more recently studies use multiple leverage ratio (i.e. total debt, short-term debt, and long-term debt) to depict a more complete picture of financing decision (Titman and Wessels, 1988; Rajan and Zingales 1995; Frank and Goyal, 2003). This paper employs four measures

of leverage: the ratio of total debt to total assets by book value (BTD), the ratio of total debt to total assets by market value (MTD), the ratio of long-term debt to total asset by book value (BLD), and the ratio of long-term debt to total asset by market value (MLD).

Following literature, this paper considers a wide range of factors that may affect firms' financing decision. Table 1 presents a summary of explanatory variables. The first factor is the *Size of firm* (*Size*). Literature generally suggests that the firm's size has a positive impact on leverage. The trade off theory argues that larger firms have lower costs of financial distress and would borrow more. The pecking order theory indicates that large firms face less information asymmetries problems and could issue informational sensitive securities than small firm (Kester, 1986). Moreover, big firms tend to choose long-term debt whilst small firms choose short-term debt (Marsh, 1982). This study uses the natural logarithm of gross sales as the proxy for the size of firm to address the possible nonlinearity of the relationship between firm size and leverage as Li *et al.* (2009) and Huang and Song (2006).

[Table 1 around here]

The second factor is the *Growth opportunity (Grow)*. Trade off theory believes that firms with high growth opportunity could face higher costs of financial distress and thus prefer equity. Firms with high growth opportunity may also have more real options for future investment (Myers, 1977). In contrary, the pecking order theory believes that higher growth opportunities lead higher capital demand for debt. The growth of a firm can be defined as the main operating income growth (MOIG) to indicate the realized growth result (Wald, 1999; Morellec, *et al.*, 2012) and the total asset growth to indicate a firm's growth potential (Titman and Wessels, 1988). This study follows the former and defines growth opportunity as the MOIG within the latest three years as in Eq. (1). As the trade-off theory explaining growth opportunity may be inapplicable to Chinese firms given their low level of technology (Chen, 2004), this study follows the pecking order theory and expects a positive coefficient.

$$MOIG = \left(\frac{OI2010 - OI2009}{OI2009} + \frac{OI2011 - OI2010}{OI2010}\right) \div 2 \quad (1)$$

where *OI* is operating income.

The third factor is *Profitability (PROF)*. The tax-based theory predicts that profitable firms with more interest tax shields may borrow more. Under the agency cost theory, Williamson (1988) argued that debt can be seen as a disciplining device for managers to ensure they maximize profit for shareholders rather than excessive pursuit of firm growth. For a profitable firm with adequate cash flow, a high leverage can restrain the management. The pecking order theory indicates that profitable firms with sufficient internal funds would borrow less. As the pecking order theory is more relevant in China (Chen, 2004; Chen and Strange, 2005), we expect a negative relationship between profitability and leverage. Profitability is measured by the ratio of gross profit to total asset (ROA).

The forth factor is *Intangibility (INTANG)*. Intangible assets (i.e. copyright, goodwill, knowledge activities and the like) play an important role in firms' financing decision (Rajan and Zingales 1995) as these assets may act as collateral (Liu, 2001). The trade off theory and the agency theory suggest a negative association between intangible assets and gearing, while the pecking order theory implies that firms with more intangible assets confront more asymmetric information problem and thus use more debt financing. The intangibility is proxied by the ratio of intangibility assets to total assets and a positive sign is expected.

The fifth factor is *Tax shields effects (Tax)*. MM theory indicates that the tax shield effect of debt incentivise firms to raise leverage. Non-debt tax shield from the tax deduction for depreciation, intangible assets amortization, and long-term deferred expenditures, has similar tax benefit (DeAngelo and Masulis, 1980). Although majority of studies affirm a positive tax shield effect on firms' financing decision, the effect may vary with different institutions and tax policies across different countries (Booth *et al*., 2001). For example, in China the central government possesses strong

controlling power on the property rights and administration of corporations, which may substantially influence tax planning and make the tax shield effect ambiguous (An, 2012). Following Chen and Strange (2005), tax shield effect is proxied by the ratio of corporate income tax to operating profit.

The sixth factor is *Business risk and Financial distress (Risk)*. The trade-off theory predicts a lower leverage ratio for firms with higher risk. Higher gearing increase the volatility of the profit, which leads to higher expected costs of bankruptcy. In contrary, the pecking order theory predicts a higher leverage ratio for firms with higher risk as these firms tend to borrow more due to adverse selection effect. Following literature (Bradley et al., 1984; Titman and Wessels, 1988; Booth et.al., 2001), this study tests for whether the trade-off theory better explains the relationship between risk and debt ratio and we expect a negative coefficient. Risk is defined as the standard deviation of the return on equity using three-year data from 2009 to 2011.

This study also considers the industrial effect on capital structure. Both theoretical and empirical literature suggests that leverage ratio differs significantly across different industries (Schwartz and Aronson, 1967; Hamada, 1972; Harris and Raviv, 1991; MacKay and Phillips, 2005; Chen, 2004; Jensen, 1986) with an exception of Hatfield *et al*. (1994) that find little industrial impact. This study divides firms into five industrial sectors, namely commercial, conglomerates, manufacturing industry, public utility, and real estate. Five dummy variables (D1-D5) are employed to capture the industrial effect on leverage.

The last factor is *Ownership structure (OS)*. Agency theory suggests that ownership structure is correlated with financing decision due to conflicts of interests between different stakeholders. In China, firms' ownership structure is different from those in developed countries due to the uniqueness of the Chinese securities market with a two-tier system of tradable and non-tradable shares. The central government holds controlling stakes in a large number of listed firms either directly through the State-owned Asset Supervision and Administration Commissions (SASAC) or indirectly by the state-controlled institutions. The state controls the marketable corporate assets at about 60% by market shares and 44% by share values (Huang and

Song, 2006), and the rest is owned by other investors (i.e., individual investors, foreign investors, and funds). This complicated ownership structure may have significant implication to financing decision and we are unable to predict the sign of the coefficients. This study classifies ownership structure into three types – state ownership (SOS), foreign ownership (FOS), and domestic private ownership (DOS).

3.2 Empirical model

The empirical specification of the model is shown in Eq. (2), which is estimated by ordinary least square (OLS) and White robust correction estimator for controlling heteroscedasticity.

$$Y_i = \beta_0 + \beta_i X_i + \sum_{j=1}^{5} \delta_j D_j + \sum_{k=1}^{3} \phi_k OS_k + \mu_i \qquad (2)$$

where Y_i denotes leverage measures (BTD, BLD, MTD, and MLD); X_i are a set of factors explaining leverage for the *i*th listed firm; D_j *(D1-D5)* is a set of industrial effect dummies; OS_k *(SOS, FOS, DOS)* is a set of ownership effect indicators; β_0 is the constant; u_i is the disturbance term; and β_i , δ_j *and* ϕ_k are coefficients to be estimated.

3.3 Data

The sample consists of a cross-section of 1481 non-financial firms for the year 2011, 734 listed in Shenzhen Stock Exchange (SZSE) and 747 listed in SHSE. The sample excludes firms with shares traded in foreign currencies, with missing ownership information, and under "special treatment". Data are collected from the China stock market research database (CSMAR) and DataStream.

Table 2 provides sample descriptive statistics. The total debt ratio and long-term debt ratio in terms of book value is 52.64% and 14.40%, respectively, suggesting that Chinese listed firms rely heavily on short-term debt financing. In terms of market value, the total debt ratio is 32.60% and the long-term debt ratio is 6.17%, affirming the dominance of short-term debt financing. In fact, 36% of listed firms in China have

no long-term debt. One reason is the under-development of the Chinese capital markets that offer limited long-term debt facilities. The other reason is that Chinese listed firms pursue the lowest cost and minimum binding force and prefer equity to debt financing that is subject to a "hard constraint". Industrial effect indicators are shown in Table 3. Real estate industry has the highest average total debt ratio by both book value (62.72%) and market value (49.37%), while public utility industry (43.47%) and conglomerates (27.46%) has the lowest debt ratio by book value and market value, respectively.

[Table 2 around here]

[Table 3 around here]

4. Empirical Analysis

Tables 4 and 5 report the OLS results. The robust estimator provides identical coefficients but different *t* statistics and results are discussed wherever relevant but not reported to save space. Table 4 is the results from the baseline models consisting of conventional determinants of capital structure. The columns (1) and (2) show results for total debt ratio and long-term debt ratio by book value and the columns (3) and (4) are for total debt ratio and long-term debt ratio by market value. Results show that leverage measures by market value are better explained with higher R^2 of 0.43 for MTD and 0.16 for MLD compared with those measures by book value with R^2 of 0.15 for BTD and 0.11 for BLD. Table 5 is the results from models with additional ownership effects. Columns (1) and (2) are results for book-valued total debt ratio and long-term debt ratio and columns (3) and (4) are total debt ratio and long-term debt ratio by market value. Similar to the baseline models, leverage ratios by market value are better explained, consistent with the original capital structure measure of MM theory. It also highlights the importance of equity market timing theory.

[Table 4 around here]

4.1. Results from baseline models

Our results show that firm size (SIZE) has a statistically significant positive impact on all leverage measures at the 99% significance level. Large firms are associated with high leverage due to their better debt financing capability, consistent with our expectation as well as the trade off theory and classic empirical studies by Rajan and Zingales (1995), Frank and Goyal (2003), and Marsh (1982). In addition to the theoretical argument that large firms suffer from less information asymmetries, our explanation is the speciality of Chinese financial markets. As argued in Chen and Strange (2005), large SOEs play a dominant role in the Chinese equity markets and they have been well supported by the state-controlled banking sector.

As expected, firms' profitability (PROF) is negatively associated with leverage ratio and the impact is more relevant to the total debt ratio by market value (MTD), providing evidence for the pecking order theory. This result is also consistent with existing studies in developing countries (i.e. Wiwattanakantang, 1999; Booth *et al.*, 2001; Chen, 2004). It appears that interest tax shield effect (the trade off theory) for profitable firms is limit in China perhaps because most of large listed firms are SOEs with multiple goals rather than profit maximization.

As to the relationship between growth opportunity (GROW) and capital structure, results are mixed. Results from OLS regression suggest that the growth opportunity has no significant impact on capital structure regardless of leverage measures employed, while the robust estimator indicates a significant effect on book value leverage ratio. Firms with high growth opportunity have a high total leverage ratio but use less long-term debt. The positive effect on BTD is consistent with the trade off theory as well as studies by Baskin (1989) and Lu and Xin (1998). Indeed, growing firms may borrow more as their retained profits are insufficient to finance their development and investment. Growing firms with better future prospect may also be reluctance to issue shares to dilute the controlling power and earnings per share. On the other hand, the negative effect on BLD reflects the fact that Chinese firms prefer short-term debt.

The intangibility (INTANG) of assets has a significant and positive effect on BLD only, indicating that firms with a higher proportion of intangible assets tend to have a higher level of leverage in book value. The corporate income tax shield (TAX) effect appears an insignificant factor for Chinese listed firms making financing decisions, consistent existing literature (i.e. Bradley et al., 1984; Alfred, 1987). The present tax policy in China is to capitalise debt tax relating to investment assets that cannot be deducted directly and the non-debt tax shield is playing an increasingly important role to substitute for the tax benefits of debt financing. The immature bond markets also limit firms' ability to benefit from tax shield effect.

Business risk and financial distress (RISK) has a significant and positive impact on BTD. One possible reason is the speciality of the Chinese financial markets and economic system in which listed SOEs make up the biggest market share. In financial distress, these SOEs are able to borrow more due to the support from the government that has the ultimate power to determine a firm's "survival" or "bankruptcy". In fact, under the protection of the central government, listed SOEs earn monopolistic income without business risk – a legacy of historical centrally-planned economy. Furthermore, the imperfection of the Chinese financial markets stimulates speculative behaviour and it is hard to explain firms' financing choices based on risk evaluation.

This study classifies firms into five industries and estimation results show a statistically significant industrial effect on capital structure as expected, partially supporting the argument that the uniqueness of industry potentially affects the choice of corporate debt levels (Schwartz and Aronson, 1967; Harris and Raviv, 1991; Jensen 1986; Titman and Wessel, 1988). The coefficients on conglomerates enterprises (D2) and manufacturing firms (D3) are insignificant for all different debt ratios, suggesting that the capital structure of these firms is not significantly different from the control group of commercial firms. An exception is that manufacturing firms have higher long-term debt ratio in term of market value. Public utility corporate (D4) tend to borrow more long-term debt (BLD and MLD) but their overall debt level is low (BTD), compared with commercial firms. Real estate firms (D5) have a significantly higher level of debt irrespective of leverage measures. This may be due to the distinct

characteristic of their asset structure that a higher proportion of tangible assets can be used as collateral to support debt financing.

4.2. Results from ownership effect models

This paper also investigates the ownership effect on capital structure, inspired by Shleifer and Vishny (1994) and DeWenter and Malatesta (2001). As reported in Table 5, our results show a strong ownership effect on leverage, which are robust given no changes in signs or significance level of coefficients on other explanatory variables when including ownership structure variables.

[Table 5 around here]

We observe a positive association between state ownership and long-term debt ratio (BLD and MLD) that SOEs hold more long-term debt, consistent with DeWenter and Malatesta (2001) and Sapienza (2004). In China, the main reason is the unique "dual roles" of the government as the controlling shareholder/owner of both SOEs and large banks (Li *et al.*, 2009). Despite of the privatization of SOEs, the government still plays a dominant role in the economy and SOEs are policy-driven rather than maximizing profit. The government prefers to shoulder the financial risk than to leverage or bail out failing SOEs. Meanwhile, the Chinese financial system is dominated by state-owned banks that grant credit to SOEs under government intervention. Moreover, it is difficult for state (as a major shareholder) to effectively monitor and control SOEs, which raise the equity agency cost and therefore enhances corporate access to more debt.

We find a negative impact of foreign ownership on total debt ratio (BTD and MTD) and the impact is more significant when employing the robust estimator. This result is in contrast to the argument of Wiwattanakantang (1999) that foreign investors are faced with more severe asymmetric information problem and may increase the leverage to establish regulatory mechanism for taking managers under control. Our results nevertheless reflect the Chinese reality. According to the newly promulgated

Law of the People's Republic of China on Enterprise Income Tax in 2008, corporate tax rate is unified at 25% for both domestic company and foreign company. However, to attract foreign investment, foreign firms are given preferential taxation treatment of 15% corporate tax rate, which encourage foreign investors to lower gearing, consistent with the trade off theory.

The domestic private ownership is found to have a negative impact on total debt ratio by market value (MTD) with little influence on book value leverage. This suggests that the domestic private shareholders use less debt financing and equity financing is the dominant choice among private firms. This is not a surprising result. In China private firms have limited access to bank credits and the loan granting process is much harder and complicated for private firms. In fact, bank credits are mainly absorbed by large SOEs under government intervention (though less explicit nowadays). As Allen *et al*. (2005) point out that domestic private firms have to rely on alternative financing channels to obtain capital based on reputation and relationships.

5. Conclusion and Future research

This paper examines the determinants of capital structure using a sample of 1481 non-financial listed firms in 2011, thereby enriching our understanding of financing behaviour in China. Employing OLS and robust estimators and measuring capital structure in terms of book value and market value, our results are generally consistent with literature in both developed and developing countries, while highlighting the speciality of Chinese financial markets.

First, we find mixed evidence supporting different theories regardless of leverage measures employed. The capital structure is positively affected by firm size, providing evidence for the trade off theory, while it is negatively affected by profitability, suggesting that the pecking order theory is more relevant. Second, we find that firms with growth opportunity have a high total leverage ratio but use less long-term debt (book value) from robust estimator. Both intangibility and business risk are positively associated with book value leverage ratio only, while tax has little impact on capital structure. This mixed evidence, however, reflects Chinese specialities, such as

persistent government intervention in SOEs and large banks, the underdeveloped financial markets, low financing cost of equity, and the dominant role of state ownership in the economy and the financial sector. The tax shield effect of liability is too limited to incentivise firms to use debt, which is hampered by the immature bond markets with limted long-term debt facilities. In this regard, the pecking order theory and trade off theory have limited explanatory power in China. The capital structure of Chinese firms is less rational that firms use significantly more short-term debt, which is in sharp contrast to the debt policy in developed countries where the long-term is more representative. Third, we also observe a strong industrial effect on capital structure. Real estate firms use considerably more debt relative to the control group of commercial firms. Conglomerate firms and manufacturing firms have a similar debt level as commercial firms, except for manufacturing firms with higher long-term debt by market-value. Public utility sector tends to have more long-term debt but the overall debt level is lower than that of commercial firms. Finally, ownership structure is found to have a significant impact on capital structure. In particular, state-owned firms employ more long-term debt, domestic private firms use more equity capital (by market value), and foreign-owned firms have a significantly lower level of debt.

Relative to developed nations, little is known about the capital structure of firms in developing countries, and in particular China. The capital markets are rapidly developing in China and future research could be in the following directions. First, this study focuses on capital choice of Chinese public listed firms and most of these firms are SOEs. However, 80% of non-listed firms are private firms and it is important to understand the capital decision of privately-owned non-listed firms given their increasingly important role in the economy. Secondly, Zingales (2000) highlights the enhanced importance of human capital in modern corporations, providing a new perspective when studying capital structure in the future. Thirdly, future study should look into other factors in a panel data context. For example, the debt-equity ratio is found to be correlated with aggregate investment and financial crises have a greater impact on the financing of corporate sectors in emerging markets (Davis and Stone, 2004), and the equilibrium in the corporate debt market is affected by macroeconomic

shocks (de Bandt, Bruneau, and Amri, 2008). Finally, ongoing financial reforms will have significant impacts on firm financing decision. Allen and Carletti (2013) suggest new theories to underpin financial reforms, and the impact on capital structure of the development of new theories should be followed up.

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Table 1: Explanatory variables: expectation, hypotheses, and definition.

Explanatory variable	Theoretical expectation	Hypothesis	Definition
SIZE	+ *(trade off)* -*(pecking order)*	+	Logarithm of gross sales
GROW	-*(trade off)* +*(pecking order)*	+	operating income growth rate during 2009-2011
PROF	+*(trade off)* -*(pecking order)*	-	Return on assets=gross profit / total assets
INTANG	-*(trade off)* -*(agency cost)* +*(pecking order)*	+	Intangible assets / total assets
TAX	-*(trade off)*	ambiguous	Corporate tax / operating profit
RISK	-*(trade off)* +*(pecking order)*	-	Standard deviation of ROE
OS	-	ambiguous	State-owned shares Foreign shares Domestic shares
Industry (Dummy variables)			D1-D5

Table 2: Descriptive sample statistics

Variables	Mean	S.D.	Minimum	Maximum
BTD (%)	52.64	37.34	0.71	668.45
BLD (%)	14.40	18.37	0.00	92.72
MTD (%)	32.60	20.80	0.21	91.43
MLD (%)	6.17	9.67	0.00	66.85
Size	2128.12	155.54	904.41	2690.29
Profitability (%)	4.98	11.89	-149.52	280.99
Growth (%)	344.07	10157.70	-90.00	390000.00
Intangibility (%)	4.97	6.67	0.00	67.64
Tax (%)	16.70	120.12	-2285.86	3727.24
Risk (%)	31.03	317.45	0.06	9697.85
SOS (%)	6.41	16.08	0.00	84.71
FOS (%)	0.69	5.56	0.00	77.59
DOS (%)	5.40	14.14	0.00	91.72

Notes: BTD: the book value of total debt ratio; MTD: the market value of total debt ratio; MLD: the market value of long-term debt ratio; BLD: the book value of the long-term debt ratio.

Table 3: Industrial average of Leverage (%)

	Number of firms	BTD	BLD	MTD	MLD
Commercial (D1)	123	54.19	10.82	34.72	3.88
Conglomerates (D2)	237	53.47	11.48	27.46	4.11
Manufacturing industries (D3)	897	52.09	12.77	31.74	5.56
Public utility (D4)	112	43.47	28.57	31.28	11.55
Real estate (D5)	112	62.72	23.38	49.37	12.55

Note: BTD = the book value of total debt ratio; BLD = the book value of the long-term debt ratio; MTD = the market value of total debt ratio; MLD = the market value of long-term debt ratio.

Table 4: The regression results: Baseline – Conventional variables (No.obs: 1481)

	(1)	(2)	(3)	(4)
LEVERAGE	BTD	BLD	MTD	MLD
SIZE (ln Sales)	0.16 ***	0.022***	0.08***	0.18***
PROP	-1.17***	-0.13***	-0.55***	-0.12***
GROW	0.55^{-4}	-4.18	0.69^{-5}	-5.35
INTANG	0.19	0.20***	-0.02	0.05
RISK	0.008***	-0.002	0.002	-3.41
TAX	0.001	0.16^{-4}	-0.002	0.27^{-3}
D2	-0.008	0.018	-0.024	0.01
D3	-0.042	0.02	-0.014	0.02**
D4	-0.109**	0.17***	-0.003	0.08***
D5	0.086 *	0.15***	0.21***	0.10***
Constant	0.26 **	-0.36***	-1.32***	-0.34***
R^2	0.15	0.11	0.43	0.16
F-statistic	26.86	18.63	109.51	27.06
Observation	1481	1481	1481	1481

Notes: (1) *, **, and *** signify the significance level at 90%, 95%, and 99%, respectively; (2) D1 is omitted to avoid multicollinearity; (3) We have tested for the correlations between independent variables and results show very low correlation among explanatory variables, indicating that the multicollinearity problem shouldn't be a major concern.

Table 5: The regression results with ownership variables

	(1)	(2)	(3)	(4)
LEVERAGE	BTD	BLD	MTD	MLD
SIZE (ln Sales)	0.15 **	0.02***	0.08***	0.17***
PROP	-1.16***	-0.13***	-0.54***	-0.12***
GROW	0.60^{-4}	-4.20	0.14^{-4}	-5.24
INTANG	0.19	0.20***	-0.02	0.05
RISK	0.008***	-0.002	0.002	-4.41
TAX	0.001	0.63^{-4}	-0.002	0.27^{-4}
D2	-0.008	0.02	-0.024	0.01
D3	-0.04	0.02	-0.013	0.02**
D4	-0.01**	0.17***	-0.004	0.08***
D5	0.09 *	0.15***	0.21***	0.10***
SOS	0.06	0.05*	-0.004	0.03**
FOS	-0.26*	-0.12	-0.17**	-0.05
DOS	-0.03	0.03	-0.06**	-0.003
Constant	0.29 **	-0.35***	-1.31***	-0.33***
R^2	0.16	0.12	0.43	0.16
F-statistic	20.99	14.79	85.39	21.28
Observation	1481	1481	1481	1481

Notes: (1) *, **, and *** signify the significance level at 90%, 95%, and 99%, respectively; (2) D1 is omitted to avoid multicollinearity; (3) We have tested for the correlations between independent variables and results show very low correlation among explanatory variables, indicating that the multicollinearity problem shouldn't be a major concern.